

# ATOMIC ENERGY

THE FIRST AND ONLY

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Dear Sir:

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President Eisenhower last week requested Congress to make certain changes in the Atomic Energy Act (1946) pointing out that "the destiny of all nations in the twentieth century will turn in large measure upon the nature and pace of atomic energy development here and abroad". The 3,700 word message recommended five amendments to the Act: (1) Relax restrictions against ownership or lease of fissionable material and of facilities which can produce it. (2) Permit private manufacture, ownership, and operation of nuclear reactors and related activities. (3) Allow the USAEC to establish minimum safety and security regulations to govern use and possession of fissionable material. (4) Allow the USAEC to supply licensees special materials and services needed in the initial stages of the new (atomic) industry at prices estimated to compensate the Government. (5) Liberalize the patent provisions of the Act principally by expanding the area in which private patents can be obtained to include the production as well as the utilization of fissionable materials. Some mechanism should also be set up he said to assure that the limited number of companies, which as Government contractors now have access to the program, cannot build a patent monopoly. The President also asked that the exchange with Allied nations of tactical information on nuclear weapons be permitted; relaxation of certain security requirements; and transfer of responsibility for safeguarding atomic weapons information from the USAEC to the Defense Department.

The uses of atomic energy for constructive purposes will be discussed at an international congress on this subject, to be held June 20-26 at the University of Michigan, Ann Arbor, under the auspices of the American Institute of Chemical Engineers, C. G. Kirkbride, president of the Institute, announced last week in New York. A dozen countries in Europe, Asia, and the Americas will send some of their leading nuclear physicists and engineers. Heading the British delegation of six will be Sir John Cockcroft, director of the Atomic Energy Research Establishment, Harwell. The French delegation will be headed by Prof. F. Perrin, who is the head of the Atomic Energy Commission of France. Representatives from Italy, The Netherlands, Norway, Sweden, Belgium, Spain, Canada, India, Argentina, and Mexico are definitely scheduled to attend, while other countries which have been invited have not as yet made commitments.

Some 168 scientists from 58 universities in the United States were at Oak Ridge, Tenn., last week attending the first National University Research Reactor Conference held by the Oak Ridge Institute of Nuclear Studies and the Oak Ridge National Laboratory. Since it is felt that the construction of nuclear reactors appears to be one of the important scientific developments ahead for universities, the conference was called to allow university scientists to consider the various nuclear reactor types, the advantages of each, specific construction problems, and to examine the significance of the nuclear reactor as an educational tool.

BUSINESS NEWS...in the nuclear energy field...

BIDS REQUESTED FOR AIRCRAFT NUCLEAR PROJECT- Bids have now been asked for facilities estimated to cost from \$2.5 to \$3 million, to be constructed at the National Reactor Testing Station, Idaho Falls, Idaho. The work will cover construction of engine test area buildings, area services, and facilities connecting to the administration assembly, and maintenance area, for the initial test area of the aircraft nuclear propulsion project at this station. This test area will be the second phase of construction of facilities for the ground testing of a prototype aircraft nuclear propulsion reactor. Utah Construction Co., Salt Lake City, last March was awarded a contract of approximately \$4.6 million for construction of an assembly and maintenance area and an administrative area. Construction of these ground test facilities is being done at the same time research and development work, primarily on nuclear phases, is being carried on at laboratories elsewhere. Under this new work, now open for bid, details may be obtained from the USAEC, P.O. Box 1221, Idaho Falls, Idaho; the contract is no. AT (10-1)-685.

ORDER FOR MATERIAL FOR PORTSMOUTH PLANT RECEIVED- An order for some 1240-tons of prefabricated piping for use in the gaseous diffusion plant being built for the USAEC at Portsmouth, Ohio, has now been received by Blaw-Knox Co., Pittsburgh. The order, which amounted to \$1,159,061 is the third piping order received by Blaw-Knox for this project. The three awards had totaled over \$3 million; they cover some 3,040-tons of special piping.

STUDY MADE OF NUCLEAR PROPELLED RAILROAD LOCOMOTIVE- Designs developed by nuclear physicists at the University of Utah, Salt Lake City, for a railroad locomotive using a nuclear reactor as a power plant, were made public last week at the university. The work was done under the direction of Lyle B. Borst, physics professor there, and was privately financed. The plans showed that the locomotive would use a reactor of the "water boiler" type, with uranyl sulphate as fuel. As projected, the locomotive would consist of two units and develop some 7,000-HP. The forward section, which would be 80-feet long, would have twelve axles to support the weight of the reactor. The reactor would be 80-feet long, 2-feet high, and 3-feet wide. It would be housed in and shielded by a steel container 4-feet thick weighing 200-tons. The second 80-foot unit would house the radiators for cooling purposes. Steam produced by the reactor, through the heat interchangers, would be used to produce electrical energy, similar in this respect to diesel-electrics. Construction costs of the locomotive were placed at approximately \$1,200,000. Dr. Borst termed this investigation the "first non-classified, non-secret study of the technical industrial uses of atomic power in the United States". The railroads cooperating in the study included the Union Pacific; Southern Pacific, Western Pacific; New York Central; and the Denver & Rio Grande. Concerns contributing information to the study included the Electromotive Div., General Motors; Commonwealth Edison, Chicago; Babcock & Wilcox Co.; General Electric Co.; Worthington Pump Co.; Westinghouse Electric; and others.

INCENTIVE PROGRAM FOR URANIUM MINING INDUSTRY SUGGESTED- Tax advantages to apply to uranium mines, as a means of encouraging the more rapid production of uranium ores, were suggested by Gordon Dean, former USAEC chairman, in a talk before a meeting of the Mining and Metallurgical Society of America, last week in New York. Mr. Dean, who is now with the investment banking firm of Lehman Brothers, New York, made two proposals: first, that uranium mining operations be free of income taxes for perhaps three years; and second, that the depletion allowance on uranium mines be increased to that now applying to oil, namely, 27%. The present uranium depletion allowance is 15%. (The depletion allowance he referred to is the percentage of the gross value of mineral ores produced and sold that non-ferrous metal miners are allowed to subtract from earnings for tax purposes.) The meeting also heard Philip W. Simmons, USAEC mining engineer, who discussed uranium prospecting. Mr. Simmons noted that the Geological Survey (for the USAEC) was now doing development drilling work, for uranium minerals, at the rate of 1 million feet per year; he estimated that the work, if done privately, would cost \$4 to \$7 per foot. (Mr. Simmons noted that if exploration costs alone could be made tax deductible, the USAEC could sharply reduce this development drilling, and concentrate on searching for wholly new areas of uranium deposits. As it is, he said, the development drilling is "just ahead of our current needs".)

NEW PRODUCTS, PROCESSES & INSTRUMENTS...in the nuclear field...

FROM THE MANUFACTURERS- Panoramic exposure shield, for use in cobalt-60 radiography. The shield was developed to enable the safe handling of strong radioactive sources for three specific requirements: (1) Exposures in internal locations, often otherwise impossible or extremely difficult to make; (2) radiography where electrical power is not available; and (3) panoramic exposure. The shield is supplied in two models. Model 202 is for safe handling of 2000 millicuries of cobalt-60. Model 402 is for safe handling of 4000 millicuries of cobalt-60. Both models consist of three basic units: First, the source shield, which is a lead-filled, steel shell holding the source. Second, the source tube, which is flexible and adjustable up to 21-feet, and by means of which the source is moved into position for exposure. Third, the control cable, which is 25-feet in length, and which permits the operator to safely expose the source. The units are housed in a cabinet. In use, the panoramic exposure shield is wheeled into position and the end of the flexible tube placed in the exact spot where the source is to be exposed. The radiographer then fully extends the control cable, and exposes the source by operating a simple mechanical control. --Technical Operations, Inc., Arlington, Mass.

An instrument specifically designed for surface and airborne oil field surveys incorporates a scaler, ratemeter, and scintillation counter. The instrument, may, of course, be used to locate uranium deposits. It employs a  $2\frac{1}{4}$ "-diameter thallium activated sodium iodide crystal as its detecting element. Ranges are 0.01; 0.025; 0.05; 0.1; 0.25; and 1 MR/HR, with a counting rate of 500,000 counts per minute in a one MR/HR field of radiation. In use, the instrument defines the limits of an oil field, and reduces the chance of drilling dry holes. --Precision Radiation Instruments, Inc., Los Angeles 16, Calif.

Several new attachments for this manufacturer's series of scintillation counters are now offered by this firm. (Initially, this firm had offered one basic counter, with attachments for specific counting jobs.) These latest attachments include a combination wide angle and collimated medical head; a new well type counter; and a new alpha counter. The firm now offers, as well, two lead shields for scintillation counters: Model LH-3 has a large door through which samples may be introduced, while LH-4 has a slide arrangement which will accept planchets up to 2" in diameter. --Nuclear Research & Development, Inc., St. Louis 14, Mo.

NOTES: A new type of experimental radiation source, which uses radioactive waste products, has now been developed at Argonne National Laboratory, Lemont (Chicago), Ill., for food sterilization studies. The source, developed by the laboratory's chemical engineering division, is a small hollow cylindrical block of concrete which was prepared by mixing cement and liquid radioactive fission products. The highly radioactive cement-fission product mixture is surrounded on all sides, top, and bottom by several inches of ordinary concrete, and a lead shield which is also several inches thick. An opening into the center of the source is provided so that materials to be irradiated may be lowered into the active region of the source. This type of source, which uses the waste products of a nuclear reactor, possesses the following advantages: (1) the radioactivity used is obtained as a by-product of reactor operations and as such is inexpensive; (2) it provides, in addition, a method of disposing of the highly radioactive waste products which present serious storage and waste disposal problems; and (3) it provides for experimental use a radiation source of the type and energy which will be used if large-scale food sterilization by irradiation proves to be feasible. This Argonne-developed source, which is equivalent in radiation intensity to several pounds of radium, has been sent to the Department of Food Technology, M.I.T., where it will be used in studies dealing with the effects of radiation on micro-organisms in food.

A 50-million volt microwave linear accelerator, the first one of its kind in the world, has now been completed by High Voltage Engineering Corp., Cambridge, for the Argonne Cancer Research Hospital, Chicago. The new machine, which combines many of the developments of radar, with the techniques of present-day nuclear physics, is the first linear accelerator commercially constructed in the United States, and the first linear accelerator for medical use in the United States. Its design is based upon fundamental research at the microwave laboratory, Stanford University, Stanford, Calif.



RAW MATERIALS...radioactive mineral and ore developments...

UNITED STATES:- Phillip L. Merritt, the USAEC's director of raw materials, reviewed uranium prospecting and development last fortnight in a talk before the Western Mining Conference, Denver. In the United States, he said, three years ago it was known that there were four uranium deposits on the Colorado plateau which had produced or had a reserve in excess of 100,000 tons of uranium ore. In the past three years, he observed, some eleven additional deposits each having a potential production in excess of 100,000 tons of ore have been developed or discovered. Several of these, he added, have potential reserves far in excess of 100,000 tons. Dr. Merritt estimated that a 100,000 ton uranium mine could be valued at present day prices at \$3 million.....Preliminary figures showing the value of metals mined in Colorado in 1953 have now been released by the commissioner of mines of Colorado. These figures show that, in Colorado, uranium mining and processing, with vanadium by-products, produced an estimated value of approximately \$75 million last year.

CANADA:- Drilling is soon to be started at the property of Iso Uranium Mines, on the company's property adjoining that of Gunnar Gold Mines, in the Athabaska area. Iso engineers have stated that they believe the structure should come in at around 2,000 feet, but they are prepared to go to at least 3,000 feet.....At the uranium property of Nu-Age Uranium Mines, in the Narrow Bay sector of the Lake Athabaska region, some 24 drill holes have been completed for a length of approximately 3,500 feet along the main zone, with all holes reported to have shown radioactivity. It is now planned to do some 500 feet of lateral work, upon the arrival of the necessary equipment.

NUCLEAR ENERGY WORK OUTSIDE THE UNITED STATES...

CANADA:- Canada's NRX nuclear reactor, at Chalk River, after undergoing repairs since its break-down some 14-months ago, was started up again last week. This is believed to be the first time that a nuclear reactor of high power rating has been disassembled after several years of operation, and then restored to service. As a result of the NRX breakdown, revisions were made to the control system and to the reactor structure itself. In addition, the restoration provided valuable information which has been applied to the reconstructed NRX reactor, and also has been incorporated in the design of the new NRU reactor, now under construction. The data will also affect the power production reactor whose design is now under study at Chalk River. The Chalk River project will now be able to re-establish the production of radioactive cobalt, for which the high neutron flux of NRX is eminently suited, and which is in some demand for beam therapy units for cancer work. Meanwhile, the Canadian government has earmarked an additional \$1,059,800 for the completion of the new NRU reactor. This will bring to \$4,805,010 the amount expended on this project within a year.

BRAZIL:- The first cyclotron which will be available for research in South America is now enroute to the Brazilian Center for Physical Research, Rio de Janeiro. The cyclotron will be used to produce radioactive isotopes for medical studies, and to train Brazilian physicists in nuclear physics. The cyclotron was built at the University of Chicago in consultation with the Brazilian physicists who will operate the device. One of the smallest synrocyclotrons in terms of physical size, the entire device is about five feet long, by two feet wide, stands 3½ feet high, and weighs 11 tons. The cyclotron is essentially a modified one-eighth size model of the University's cyclotron, and, with magnets 21-inches in diameter, will possess energies of six and one-half million volts.

BERLIN:- Last week saw the conclusion here of talks which have been held by John Foster Dulles, U. S. Secretary of State, and V. M. Molotov, Soviet Foreign Minister, on President Eisenhower's proposal for an international "atomic energy pool". While the talks were concluded, it did not indicate a stalemate, officials observed, since the discussions were on procedural matters, and did not go into the substance of the problem. Before this Berlin conference, G. N. Zaroubin, Soviet Ambassador to the United States, had two talks with Mr. Dulles on the subject in Washington, and Charles E. Bohlen, U. S. Ambassador to Russia, met with Mr. Molotov in Moscow. These channels will remain available for further discussions.

ATOMIC PATENT DIGEST...latest U. S. grants in the nuclear field...

Continuous recording high speed frame camera, comprising (in part) a thin, two-faced rotating optical mirror, means for transmitting light from the object to be photographed to focus and form two stationary images in space substantially at the reflecting surface of the rotating reflecting means, and from different angular positions with respect to the rotation of the reflecting means. Also, a primary image forming means, a means for dividing the primary light beam into two identical beams, and a dual optical system for relaying and focusing the two beams. U.S. Pat. No. 2,668,473 issued Feb. 9, 1954; assigned to United States of America (USAEC).

Sylphon sealed pump, comprising (in part) a cylinder, and a piston within this cylinder, the piston being provided with a peripheral flange extending beyond one face to reduce leakage between the piston and the cylinder. The periphery of the piston is spaced from the wall of the cylinder by a small positive operating clearance so that there is no mechanical contact between the piston periphery and the cylinder wall. U.S. Pat. No. 2,668,656 issued Feb. 9, 1954; assigned to United States of America (USAEC).

Distillation system for use in recovering spent pumping oils comprising (in part) several column sections, including a base heater, a section containing vapor distributing means, an intermediate reduced pressure section comprising several spaced overlapped tubular orifice forming members providing oil collecting troughs, a fractionating section, and condensing and reflux sections. A vacuum pump is connected into the system, and the intermediate reduced pressure section is provided with means for determining the degree of pressure prevailing therein. Means are also provided for withdrawing the processed oil accumulating in this section. U.S. Pat. No. 2,668,794 issued Feb. 9, 1954; assigned to United States of America (USAEC).

Relay system comprising (in part) three electrical circuits and three switching devices having switch contacts connected in parallel and adapted to control an electrical circuit, each device being connected in all of the electrical circuits and being actuated by energization of more than one and less than all of these circuits. Condition responsive means are connected in series with each of the electrical circuits, with each of the electrical circuits being energized by the condition responsive means. U.S. Pat. No. 2,668,934 issued Feb. 9, 1954; assigned to United States of America (USAEC).

Electromagnetic fluid pump for generating an impelling pressure on a conducting fluid. Comprises (in part) a magnetic core structure and a fluid channel, this fluid channel having an inlet and an outlet end. The magnetic core structure comprises a field envelope and a field core, the field core being elongated and of closed geometric configuration in the direction normal to this elongation, and bounded on the outside in the direction of elongation by a plurality of surfaces which alternately diverge and converge with respect to the channel inlet, being therein a mechanical system for admitting fluid into the channel inlet, and for exhausting it through the outlet end. U.S. Pat. No. 2,669,183 issued Feb. 16, 1954; assigned to United States of America (USAEC).

BOOKS & OTHER PUBLICATIONS...on nuclear subjects...

The Actinide Elements. This is volume 14-A, plutonium project record, of the national nuclear energy series. G. T. Seaborg, and J.J. Katz are editors. Eighteen authors have contributed to this volume which contains the chemistry of all the elements from actinium to the recently discovered transplutonium elements berkelium and californium. 870 pages.--McGraw-Hill Book Co., New York 36 (\$11.75)

The Cyclotron. by W.B. Mann. A fourth edition of a work first published in 1940, elaborated upon by the addition of a chapter. 110 pages.--John Wiley & Sons, Inc., New York 16 (\$2.00).

Sincerely,

The Staff,  
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